

REMARKS

Claim 1 has been amended to include recitations of claims 2, 3, 5, and 12, with the amendment being supported by paragraphs [0021] and [0024] in US 2007/0027335 (the publication of the present application). Claims 2 and 12 have been canceled, and the dependency of claims 3 and 5 has been amended accordingly. Claim 13 has been amended based on paragraph [0024] in US 2007/0027335 (the publication of the present application).

Entry of the above amendment is respectfully requested.

Obviousness Rejection

On page 3 of the Office Action, in paragraph 3, claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando et al. (U.S. Patent Number 6,602,970) in view of Arlt et al. (U.S. Patent Number 4,986,884).

Applicants respectfully submit that the present invention is not obvious over the cited art alone or in combination, and request that the Examiner reconsider and withdraw this rejection in view of the following remarks.

1. Ando et al. (US 6,602,970)

Ando et al. discloses stabilizers for anion polymerization such as BF₃/methanol complexes (column 7, lines 10 to 16).

However, the invention described in Ando et al. is an invention of a 2-cyanoacrylate composition, and Ando et al. does not disclose:

- (1) a polymerization inhibitor for distillation, and

(2) a combination of a polymerization inhibitor having a boiling point at normal pressure of within $\pm 12^{\circ}\text{C}$ of the boiling point at normal pressure of the purified 2-cyanoacrylate and a polymerization inhibitor having a boiling point that is higher than the boiling point of the 2-cyanoacrylate by more than 12°C .

Therefore, Ando et al. does not teach nor suggest the present invention.

2. Arlt et al. (US 4,986,884)

Arlt et al. teaches that distillation is one way of purifying 2-cyanoacrylate (column 1, lines 12 to 18).

However, Arlt et al. does not disclose:

(1) a polymerization inhibitor having a boiling point at normal pressure of within $\pm 12^{\circ}\text{C}$ of the boiling point at normal pressure of the purified 2-cyanoacrylate,

(2) a halocarboxylic acid, a halosulfonic acid, a BF_3 methanol complex and a BF_3 ethanol complex, and

(3) a combination of a polymerization inhibitor having a boiling point at normal pressure of within $\pm 12^{\circ}\text{C}$ of the boiling point at normal pressure of the purified 2-cyanoacrylate and a polymerization inhibitor having a boiling point that is higher than the boiling point of the 2-cyanoacrylate by more than 12°C .

Moreover, the present specification describes that "The present inventors have found that the polymerization inhibitor used in JP-A-1-135754 has a boiling point that is higher than the boiling point of ethyl 2-cyanoacrylate by more than 12°C , and when a polymerization inhibitor having a boiling point that is higher than the boiling point of a 2-cyanoacrylate by more than 12°C is used, the 2-cyanoacrylate easily polymerizes in the distillate system. When the reason therefor was investigated, it was found that, although

the use of such a polymerization inhibitor can prevent polymerization in a distillation column for which its use is targeted, since the polymerization inhibitor, as a vapor, does not accompany the 2-cyanoacrylate, it cannot spread to the distillate system." (see paragraph [0011] in US 2007/0027335 (the publication of the present application)), and Applicants note that JP-A-1-135754 is a patent family publication of Arlt et al. (US 4,986,884).

Therefore, Art et al. does not teach nor suggest the present invention.

3. Ando et al. (US 6,602,970) in view of Arlt et al. (US 4,986,884)

At least the following four points are selected as important features in amended claim 1 of the present invention.

(A) An anion polymerization inhibitor having a boiling point at normal pressure of within $\pm 12^{\circ}\text{C}$ of the boiling point at normal pressure of the purified 2-cyanoacrylate is used.

(B) The anion polymerization inhibitor having a boiling point at normal pressure of within $\pm 12^{\circ}\text{C}$ of the boiling point at normal pressure of the purified 2-cyanoacrylate is a halocarboxylic acid, a halosulfonic acid, a BF_3 methanol complex or a BF_3 ethanol complex.

(C) Distillation selections in amended claim 1 of the present invention are carried out by further adding, to a 2-cyanoacrylate in a vessel, an anionic polymerization inhibitor that has a boiling point that is higher than the boiling point of the 2-cyanoacrylate by more than 12°C .

(D) Distillation selections in amended claim 1 of the present invention are carried out by further adding, to a 2-cyanoacrylate in a vessel, a radical polymerization inhibitor

that has a boiling point that is higher than the boiling point of the 2-cyanoacrylate by more than 12°C.

Ando et al. discloses BF_3 /methanol complexes (column 1, lines 14 to 15), and Arlt et al. discloses hydroquinone (column 2, line 43).

However, Ando et al. and Arlt et al. neither teach nor suggest selecting (A) to (D) above.

4. Advantageous effects of the present invention

The present invention can provide a method that, unlike the case in which an acidic gas is used, does not have problems in terms of the operation and the environment, and that can continuously prevent a 2-cyanoacrylate from polymerizing in the distillate system when distilling the 2-cyanoacrylate (see paragraphs [0007] to [0010] in US 2007/0027335 (the publication of the present application)).

Ando et al. and Arlt et al. neither teach nor suggest the effect mentioned above.

Moreover, about a polymerization inhibitor, there are following descriptions in the specification of the present invention:

"However, even if the above-mentioned polymerization inhibitor such as diphosphorus pentoxide or hydroquinone, or the polymerization inhibitor such as a BF_3 ether complex salt or a BF_3 carboxylic acid complex salt is used, there is still the problem that the 2-cyanoacrylate easily polymerizes in the distillate system." (see paragraph [0007] in US 2007/0027335), and

"Furthermore, with regard to the method in which distillation is carried out under a flow of an acidic gas such as SO_2 , BF_3 , HF, or CO_2 , since a 2-cyanoacrylate thus obtained contains a large amount of acidic gas, it is necessary to remove this acidic gas by

degassing, etc. Moreover, since these acidic gases are discharged as exhaust gas, removal equipment is necessary, and there are problems in terms of the operation and the environment." (see paragraph [0008] in US 2007/0027335).

Thus, Applicants submit that the present invention is not obvious over Ando et al. in view of Arlt et al., and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



Bruce E. Kramer
Registration No. 33,725

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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